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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,701	01/08/2002	Deenesh Padhi	AMAT/5933/CALB/COPPER/PJS	7735

32588 7590 08/27/2004

APPLIED MATERIALS, INC.
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EXAMINER	
WILKINS III, HARRY D	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 08/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/043,701	PADHI ET AL.
	Examiner	Art Unit
	Harry D Wilkins, III	1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-7,9,12-21,28,29,31,35,36 and 45-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-7,9,12-21,28,29,31,35,36 and 45-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0702*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Allowable Subject Matter

2. The indicated allowability of claims 4-7, 9, 12-21, 28, 29, 31, 35, 36 and 45-49 is withdrawn in view of the newly discovered reference(s) to "Applications of Potentiometry". Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 4, 6, 7, 12-15, 17-19, 28, 45 and 48 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by "Applications of Potentiometry".

"Applications of Potentiometry" (henceforth AoP) anticipates the invention as claimed. AoP teaches (see first sentence on page 412) using the method for measurement of analyte concentrations. AoP further teaches (see section 19B, pages 415-423) that the method includes determining a relationship between the concentration of the analyte (i.e.-conductive species in an aqueous solution) with the voltage of an electrochemical cell (and thus inherently the resistance of the cell since the voltage and resistance are proportional to each other based on a known current, i.e.-Ohm's law) by

calibration of the cell (see section 19B-2) which includes taking several measurements at known concentrations to calculate the constant K, e.g.- in equation 19-7, such that a relationship is determined relating the measured voltage to the concentration of the conductive species, pX or pA. Then, a test sample is tested and, based on the measured voltage, the unknown test concentration of the species is determined from the relationship.

Regarding claims 4, 15 and 28, AoP teaches (see section 19B-2) performing multiple calibration steps at various concentrations until the constant K is known.

Regarding claims 6, 7, 17 and 18, the test concentration would inherently be between the maximum and minimum calibration concentrations because the calibration curve developed would only apply between the lowest and highest values of concentration tested.

Regarding claim 12, AoP does not expressly teach the step of "concluding the test concentration is within a specified range when the test concentration is less than a pre-determined maximum concentration and more than a predetermined minimum concentration". However, as the operator of the method of AoP would inherently perform such a step, the claim is still anticipated.

Regarding claim 13, AoP teaches (see section 19B-4) using the method to determine pH, i.e.-concentration of hydrogen and hydroxyl ions.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 5, 9, 16, 20, 21, 29, 31, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Applications of Potentiometry".

Regarding claims 5 and 16, AoP teaches (see Table 19-2, page 422) that there is a variation in activity based upon variations in temperature of a solution (based on conductive particle being H^+ or OH^-). Therefore, it would have been obvious to one of ordinary skill in the art to have added an additional variable for calibration, that being temperature, and as such, would have adjusted the temperature and performed the calibration again with the known concentrations. The motivation to do so comes from when the measurement process is used on a solution which will not have a constant temperature and some sort of temperature compensation is needed.

Regarding claims 29 and 35, the total current flowing through the electrochemical cell would affect the relationship between voltage and concentration. Therefore, it would have been obvious to one of ordinary skill in the art to have added an additional variable for calibration, that being current, and as such, would have adjusted the current and performed the calibration again with the known concentrations. The motivation to do so comes from when the measurement process is used on a solution which will not have a constant current and some sort of current compensation is needed.

Regarding claims 9, 20 and 31, AoP does not expressly teach how the second calibration concentration is achieved. However, it would have been within the expected skill of a routineer in the art to have merely added a known quantity of the species to the

existing first calibration concentration to avoid having to create many different solutions and emptying the electrochemical cell of the calibration solution after each test.

Regarding claim 21, AoP is silent as to the electrical conductivity of the cell. However, it would have been within the expected skill of a routineer in the art to have applied the generic principles taught by AoP to any cell with any conductivity, including between 40 and 1000 mS/cm^2.

Regarding claim 36, it would have been within the expected skill of a routineer in the art to have used any conventional material for the anode in the process, such as copper.

7. Claims 46, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Applications of Potentiometry" in view of Reid (US 6,458,262).

AoP does not teach beginning an electroplating operation and the measuring step occurring during the electroplating.

Reid teaches (see abstract, Fig. 3 and) an electroplating process where the concentration of a conductive species (pH and/or chloride ions) is monitored during electroplating.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the measuring method of AoP to the process of Reid during the electroplating process in order to determine the concentration of ions present in the solution in order to ensure that the concentration remains constant to cause uniform plating.

Response to Arguments

8. Applicant's arguments with respect to claims 12, 45, 48 and 49 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700